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China, Peoples Republic of

Bio-Fuels

An Alternative Future for Agriculture

2006

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Report Highlights:
Ethanol production in 2005 was approximately 920,000 metric tons (MT), with a production capacity of 1,020,000. Biodiesel production totaled between 100,000 and 200,000 MT. China's current biofuel development policies are to increase ethanol production to nearly 4 million MT by 2010 and meet 15 percent of China's transportation energy needs by 2020. The ability of China to meet these objectives depends on competing uses of inputs, including corn, wheat, rice, sugar, cassava, sweet sorghum and oilseeds, and outputs, including sweetener, and alcohol.

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Executive Summary

Strict government regulation and control, to the exclusion of private industry, characterizes biofuel development in China. While a relatively fledgling industry, the biofuel market has policies and standards in place and clear government objectives for future development: biofuels will meet 15 percent of China's transportation energy needs by 2020. The ability of China to meet these objectives depends on competing uses of inputs, including corn, wheat, rice, sugar, cassava, sweet sorghum and oilseeds, and outputs, including sweetener, and alcohol.

China produces two types of biofuels, fuel ethanol and biodiesel. Over the past two decades, China has encouraged research and development, legislation, and a phased introduction of biofuels to the industry and consumers. Through subsidies and other financial mechanisms, the central government encouraged biofuel development. As a result of biofuel development, China has also benefited from international recognition of the possible environmental benefits from lowered emissions and clean development projects.

Increased development of biodiesel is an expected result of the diesel market in China being twice that of gasoline. While the government has been addressing ethanol for the past twenty years, it only began including biodiesel in 2006 in its policy mix. The result is that while strict fuel ethanol production standards are in place there are not equivalent standards for biodiesel.

Ethanol production in 2005 was approximately 920,000 metric tons (MT), with a production capacity of 1,020,000 metric tons. Biodiesel production totaled between 100,000 and 200,000 MT. Under China's current biofuel development policies, ethanol production should increase to nearly 4 million MT by 2010.

China exports a small amount of fuel ethanol, but exports are likely to decrease as it supplies increased domestic demand; due to high tariffs and restrictive import policies, fuel ethanol imports are unlikely in the short run. Feedstock imports for biofuel production will rise over the next few years, however, to meet the increasing domestic demand of fuel ethanol production.

Corn, sugar, oilseeds, sweet sorghum, wheat and cassava are likely to take on new importance, as feedstock sources for ethanol. Efficiency and cost will determine which feedstock sources will dominate the future biofuel industry.

Biofuel development will impact on food self-sufficiency and food security, which has slowed the Chinese government's development of the biofuel sector.

BIOFUELS: BACKGROUND

The Kyoto Protocol defines biofuels as gas or liquid fuel made from plant material (biomass) or other waste: wood, wood waste, wood liquors, peat, railroad ties, wood sludge, spent sulfite liquors, agricultural water, straw, tires, fish oils, tall oil, sludge waste, waste alcohol, municipal solid waste, landfill gases, other waste, and ethanol blended into motor petroleum. The principle economically viable biofuels are ethanol and biodiesel. Others exist, but production is costly and technical production limitations limit their market potential.

Ethanol has three principal venues: the energy market, the alcohol market, and the chemical market. Ethanol (ethyl alcohol), depending upon its market destination, is distilled and purified in varying degrees. Purification and distilling standards differ by country. (China's standards are listed in the Biofuels Standards section of this report.) Industrial-grade ethanol is destined for the chemical market (principally, chemical production and medicinal use). Food-grade ethanol (undenatured ethanol), is destined for the alcohol market and is safe for human consumption. Fuel-grade ethanol (fuel-ethanol, bioethanol, or denatured ethanol) is distilled for the energy market to be blended with gasoline. There are a variety of blending ratios for fuel-ethanol, including E5 (gasoline that is 5% ethanol), E10 (10%), E85 (85%), and E100 (100%). Prices tend to be directly related to the ethanol-blending ratio and carbon emissions are inversely related to the blending ratio. Ethanol production is technologically safe and simple.

There are three inputs for ethanol production:

1. Grain-based feedstock (corn, wheat, rice, etc.)
2. Non-grain-based (NGB) feedstock (cassava (tapioca), sugar (beets and cane), sweet sorghum, sweet potato)
3. Cellulose (any organic matter: agricultural waste, grasses, sewage, sludge, switchgrass, plant stalks, trees—virtually anything that contains carbon)

Ethanol production plant technology is feedstock-specific. However, many modern plants look towards feedstock flexibility and adaptation as ways to increase productivity and efficiency.

The energy market is the sole venue for biodiesel. Biodiesel is a mixture of long-chain fatty acid esters, conventionally manufactured through trans-esterification of triacylglycerol (TAG, i.e. plant oil and animal fats) with methanol, catalyzed by inorganic bases or acids. Just as ethanol is blended with gasoline, biodiesel is blended with diesel (or used directly in a diesel engine). Similar blending rates exist: B5, B10, B85, and B100. In a like manner, prices tend to be directly related to the biodiesel-blending ratio and carbon emissions are inversely related to the blending ratio. Biodiesel production is technologically more complex than ethanol production, but it is still fairly simple. Any oil-based/fatty organic matter is an eligible source for biodiesel production. Animal waste, soybeans, and oilseeds are typical stocks used for biodiesel production. Large amounts of glycerol result as byproducts of biodiesel production. Scientists have struggled for some time over the efficient use of the byproduct. Popular belief is that glycerol can be used for three purposes: material production (plastics and fibers), thermal biomass combustion, and possibly as an alternative energy source in and of itself. EU countries have relied principally on rapeseed for biodiesel production. The US continues to rely on soybeans. Many Asian countries are looking to their abundant palm oil.

National emphasis on different types of biofuel development depends on the country's energy needs and long-term development strategy.

CHINA'S BIOFUEL SITUATION

China views biofuels as an essential and strategic component of a secure economy and diversified energy policy. To ensure development of biofuels, the central government takes an active role in regulating both the supply and demand sides of the biofuel market and has limited ownership of production facilities to state industry. With a propensity for command and control, the use of state-run industries to develop biofuel insures the central government adequate "regulation." The National Development and Reform Commission (NDRC) has been the leader in the biofuel development arena, guiding future energy production and consumption in China.

KEY OBJECTIVES: DEVELOPMENT, SECURITY, AND INTERNATIONAL RECOGNITION

China's stated objectives for biofuel development are (1) the improving of the welfare of Chinese rural citizens in China; (2) strengthening China's energy security and reducing their oil dependence; (3) the mitigation of emissions noxious to the environment. The subtext is (1) farm support prices, (2) national security, and (3) membership and recognition in the international community.

While Chinese coastal areas boom, growth in inland areas proceeds at a much slower pace. Biofuel production is one of a series of programs to mitigate rural poverty. With most plants located in the northeast, currently ethanol provides an outlet for 10 percent of corn production of northeastern provinces' (Jilin, Liaoning, Heilongjian, Hebei, and Henan) corn production, particularly of low quality and older stocks, and could add crops for biofuel production on otherwise marginal land. With additional plants, Northwestern provinces (Xinjiang, Qinghai, Inner Mongolia and Gansu) could increase their agricultural market by growing sweet sorghum. With additional plants in southern China, the sugar cane, cassava and Jatropha could be expanded to meet increased ethanol production objectives.

In 1975 when China became a net importer of oil, energy security became a concern. Now China depends on coal for 70% of its energy, with most of the remainder fuel oil use for transportation. Consumption in this sector is growing rapidly. Presently biofuels are approximately one million metric tons (MT). China's policy objectives are produce 12 million MT of biofuels, including ethanol and biodiesel, annually by 2020, pushing it up to 15 percent of the nation's transportation fuel use.

Taking leadership in the biofuel sector also fits into China's aspirations to be a leader in the global arena as it uses biofuel to reduce pollution and conserve its environmental assets, consistent with the Kyoto Protocol objectives.

VEHICLE AND PETROLEUM MARKETS BOOM

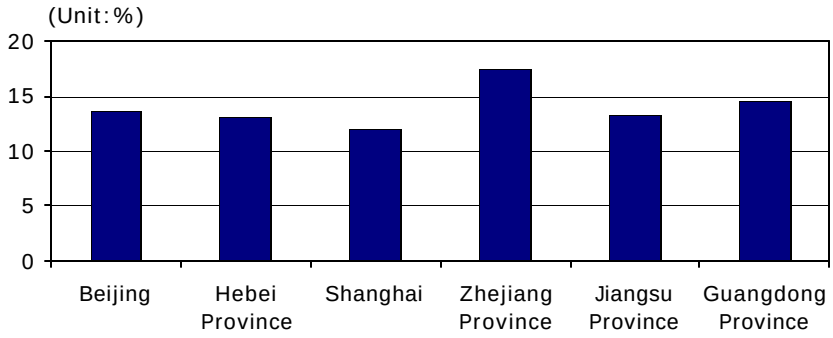
Higher disposable incomes make private vehicle ownership a possibility

Over the past two decades, China's vehicle market has been the fastest growing in the world. As disposable income increases, more and more people in China are purchasing privately owned vehicles. According to data from the National Bureau of Statistics of China, the number of automobiles owned nationwide reached 26.94 million in 2004 (passenger cars: 17.36 million; trucks: 8.93 million; others: 0.65 million). The average growth rate between 1986 and 2004 was 11.8 percent. In Beijing alone, authorities report 1,000 new cars are added each day to the city's roads.

Mirroring Brazil's example (where 80 percent of passenger vehicles are flex-fuel), Nanyang, a city in Henan province, is set to pilot a flex-fuel transportation program in China. The city will

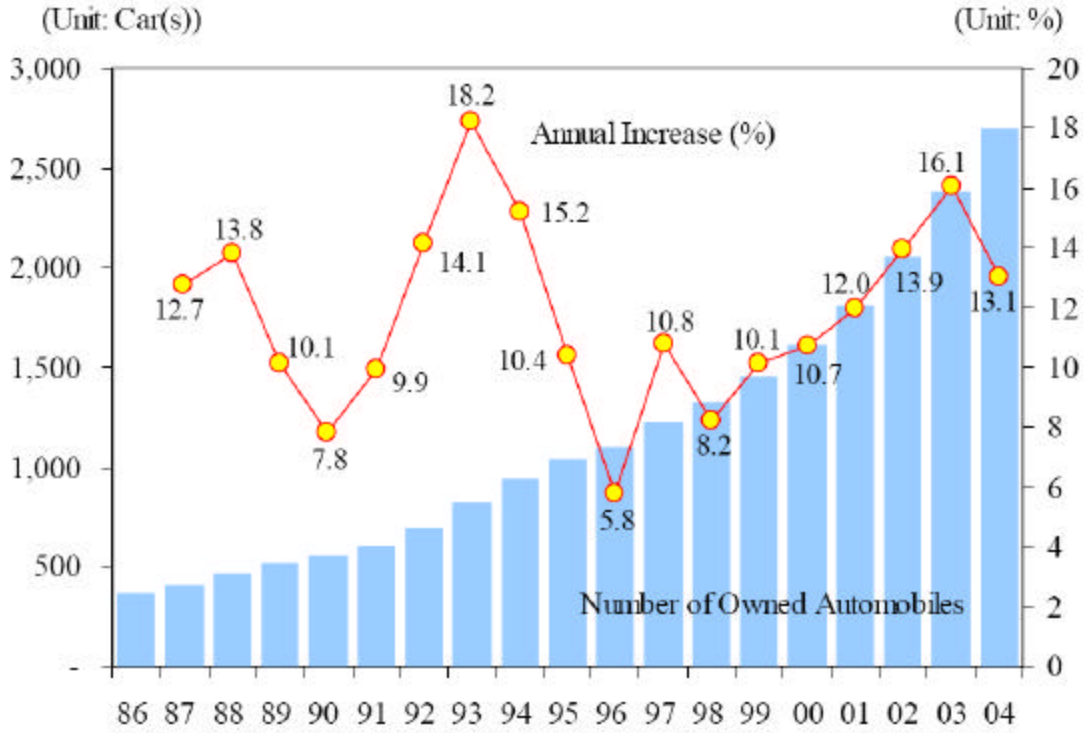
experiment with 100 flex-fuel vehicles and 3-5 flex-fuel public transportation buses from the EU. Future research and development will be based on this first pilot program.

Average Annual Growth Rate in Vehicle Ownership in Significant Regions (1986-2004)



The most significant vehicle ownership growth rates are occurring in the coastal provinces and municipalities. These are the same provinces that are experiencing the highest net economic growth rates.

Number of Automobiles Owned in China and Changes in Annual Increase (1986-2004)



Source: China Statistical Yearbook 2005 (First Edition)

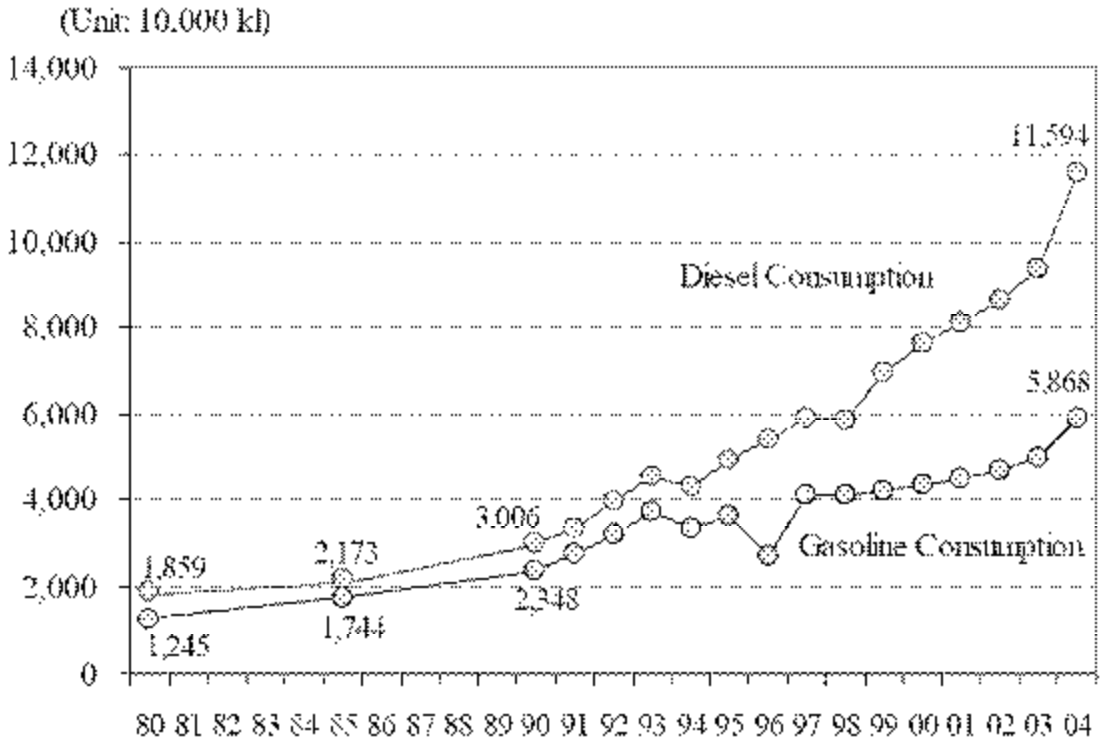
Vehicle growth a catalyst for petroleum expansion

China's consumption of crude oil totaled 323 million tons in 2005, including net crude-oil imports of 119 million tons. Consistent with new car use, the annual average growth rate for gasoline and diesel during the period from 1990 to 2004 reached 6.8 percent and 10.1

percent respectively. One of the significant reasons for the high diesel average growth rate is the widespread use of public and private trucks. The growth of farming trucks and mechanized farm equipment has contributed to the diesel market's remarkable growth. Increasing bio-energy production and consumption will help ease the country's oil shortage.

There is currently a gasoline import ban which was established 1999. Gasoline consumption, principally for passenger vehicles, in 2004, was 50.35 million MT with an annual growth rate of 17.4 percent while gasoline exports were 5.75 million MT, 28.3 percent lower than the previous year. This trend is forecast to continue as high domestic gasoline demand slowly eliminated exports.

Changes in the Consumption of Gasoline and Diesel in China (1980-2004)



Source: China Statistical Yearbook and China Energy Statistical Yearbook

At the beginning of 2005, the Ministry of Finance and the State Administration of Taxation announced their intention to temporarily suspend the value-added tax rebate for gasoline, jet fuels and naphtha exports, effective from September 1, 2005, to December 31, 2005, to demonstrate the nation's policy of placing energy priority on internal demand.

ETHANOL

Policies encourage quality production but limit growth

The three phases of China's biofuel development are 1) research and development of relevant technologies for biofuel production, accompanied by a period of demonstration

(1986-2001); 2) legislative infrastructure (2001-2004); 3) enforcement, accompanied by pilot programs that gradually expand, if successful (2004-present).

1. Initial research centered on ethanol, biodiesel and fermented methane gas, under *the National High Technology Research and Development Initiative* (also known as *Plan 863*), which came into force in March 1986. Scientists at the Chinese Academy of Social Sciences led the research team. The focus was on six different sectors: telecommunications, biotechnology, energy, automation, new materials, and ocean development. Research on alcohol mixed transportation fuels was carried out under the auspices of China's Ministry of Science and Technology (MOST). The Tian Guan Group, based in Nanyang, Henan Province, launched a 200,000 tons ethanol production testing. A pilot program sprouted from this production in three Henan cities: Zhengzhou, Luoyang and Nanyang, in cooperation with the National Development and Reform Commission (NDRC) and the China Petroleum and Chemical Corporation (SINOPEC).

2. Legislation—phase two—followed on April 2, 2001, when China released laws on *Denatured Fuel Ethanol* (GB18350-2001) and *Bioethanol gasoline for Automobiles* (GB18351-2001). These laws established standards for the production of E10. A year later on March 22, 2002, the government enforced the *Law Concerning Testing for the Use of Bioethanol Gasoline for Automobiles*, launching a model to introduce E10 into specified areas of China. The second phase of biofuel development established a legal system for biofuel (and for the relevant raw materials required) production, transportation and sales. The Bioethanol Utilization Plan was included in the 10th Five-Year Plan (2001-2005).

3. Following the pilot programs, on February 10, 2004, China announced its *Law Concerning Testing for the Extensive Use of Ethanol Blended Gasoline for Automobiles and the Regulations Concerning the Conduct of Testing for the Extensive Use of Ethanol Blended Gasoline for Automobiles*. This marked the beginning of phase three. All relevant conditions for extension of the pilot program made this incremental step forward possible. Logistics, sales, and production were all satisfactory at the small scale. The ethanol *Extensive Use Law* stipulates the following:

a. The establishment of an administrative system: China set up a special group to promote biofuel development, particularly the use of E10 for automobiles. NDRC would lead the group, while SINOPEC and China National Petroleum Corporation (CNPC) would be the subgroup leaders.

National Ethanol Promotion Team

Group Leader	National Development and Reform Commission
Subgroup Leaders	China National Petroleum Corporation (CNPC) China Petroleum and Chemical Corporation (SINOPEC)
Members	Ministry of Public Security Ministry of Finance Ministry of Commerce State Administration of Taxation State Environmental Protection Administration of State Administration for Industry and Commerce General Administration of Quality Supervision, Inspection and Quarantine State Grain Administration

Source: Law Concerning Testing for the Extensive Use of Ethanol

b. The establishment of an ethanol production system that incorporates financial incentives.
c. Supplementary policies regarding adjustment, transportation and sales: the selling price for E10 is calculated by multiplying the shipping price of the 90# gasoline published by NDRC by a factor of 0.9111. Hence the fluctuation range of the ethanol-selling price resembles that of traditional gasoline.
d. Areas and terms: by the end of 2005, E10 products will have been made available throughout the regions of Heilongjiang, Jilin, Liaoning, Henan and Anhui Provinces. The central approach is to gradually introduce E10 to six cities in Hebei Province, seven cities in Shandong Province, five cities in Jiangsu Province, and nine cities in Hubei Province. (These regulations do not cover the military sector or the national special stockpiles.)

Although it has begun research on energy development through the use of biomass, despite its pertinent role as the coordination point for feedstock production (both grain-based feedstock and non-grain based (NGB) feedstock), the Ministry of Agriculture does not participate in the NDRC subcommittee on biofuels promotion. Food security is a more important objective of MOA more than biofuel production.

In late 2006, China will release implementation plans of the biofuels component of the 11th Five-Year Period (2006-2010). Implementation questions include whether China sets a national target for ethanol in its national energy mix.

Ethanol producers' dependence on government subsidies will determine industry growth. Ethanol subsidies have been declining and may be phased out entirely by the end of the 11th Five-Year Period. The policy direction, articulated in a recent (May 2006) NDRC report, is to expand supply by requiring ethanol use in State municipalities (Beijing, Shanghai, and Tianjin) and expand demand through government sponsored constructing of new ethanol production plants, including one in Guangxi Province (cassava-based) and one in Hubei Province (rice-based).

The cost of fuel ethanol production cost is roughly $563/MT (4,500 Yuan/MT), with stale grain as the raw material. The cost is approximately $500/MT (4,000 Yuan/MT) when using sweet sorghum or cassava as raw materials. In China, fuel ethanol is profitable when oil prices approach $3.00/gallon (6 Yuan/liter). However, content requirements and the influence of state owned purchasers of biofuel will define demand.

China has launched sweet sorghum-based ethanol production on a trial basis in Heilongjiang, Inner Mongolia, Shandong, Xinjiang and Tianjin. Presently the trial project in Heilongjiang is capable of producing 5,000 MT of ethanol a year. Sorghum-based ethanol will remain in the testing stages until technology and efficiency bring the product up to par with competing raw materials. There is some question, however, whether the domestic supply of sorghum, cassava, and sugarcane can meet the demand to produce 30 million MT of fuel ethanol.

While there are many budding industries and sources of biomass energy in China, in the long-term, economic feasibility will be the determining factor. Whether the industries use corn, sugar, switchgrass, or synthetic substances for biofuel production depends on what organic source is most profitable.

In the foreseeable future, the government will dominate ethanol development. Thus, while there are countless small private natural ethanol production plants in China producing food grade alcohol, the four fuel ethanol production plants are all run by state-owned enterprises. By fiat, these producers can only sell their products to SINOPEC and CNPC, the two state-run

petroleum companies. SINOPEC and CNPC then blend the ethanol with gasoline and distribute E10 to gas stations. Over 95% of the gas stations in China are state-owned. Fuel ethanol production is dominated by the government and will not be influenced by public awareness or consumer demand in the short- and medium-term.

Ethanol gets strict quality standards

On April 18, 2001, the *Denatured Fuel Ethanol* and *Bioethanol Gasoline for Automobile* national production technology standards were established in order to set uniform, quality levels across the board. Since the China Petroleum and Chemical Corporation (SINOPEC) and the China National Petroleum Corporation (CNPC) regulated the distribution and sales of the denatured ethanol, internal standards for blending, storage and transportation of E10. Saccharification, fermentation and additive standards are listed below, however.

Chinese Denatured Ethanol Standards

Item	Standard	Unit of Measurement
Appearance	Clarification	
Ethanol Content	= 92.1	Vol%
Methanol Content	= 0.5	Vol%
Actual Washed Gum	= 5.0	mg/100ml
Moisture Content	= 0.8	Vol%
Chlorine Ion	= 32.0	mg/l
Acidity	= 56.0	mg/l
Copper Content	= 0.08	mg/l
pH Value	6.5 – 9.0	

Note: the pH values prior to April 1, 2002, were 5.7 to 9.0.

Source: Denatured Fuel Ethanol (GB18350-2001)

Chinese Ethanol Mixed with Gasoline Standards

Item		Index			Unit of Measurement
		90#	93#	95#	
Octane Number	=	90	93	95	
Lead	=	0.005			G/l
Distillation Characteristics					
10% distillation temp.	=	70			°C
50% distillation temp.	=	120			°C
90% distillation temp.	=	190			°C
Residual oil volume	=	2			Vol%
Vapor Pressure					
Sept. 16 to Mar. 15	=	88			kPa
Mar. 16 to Sept. 15	=	74			kPa
Actual Gum	=	5			Mg/100ml
Sulfur Content	=	0.1			%
Sulfuric Acid	=	0.001			%
Copper Corrosion	=	1			50°C, 3h
Moisture Content	=	0.15			%
Ethanol		9.0 – 10.5			Vol%
Benzene	=	2.5			Vol%
Aromatic Hydrocarbon	=	40			Vol%

Source: Bioethanol Gasoline for Automobiles (GB18351-2001)

Central government financial incentives make production viable

According to the *Law Concerning Testing for the Extensive Use of Ethanol Blended Gasoline for Automobiles and the Regulations Concerning the Conduct of Testing for the Extensive Use of Ethanol Blended Gasoline for Automobiles*, the following financial incentives are in place:

1. Refund of value added taxes (appreciation duties).
2. Five percent consumption tax on ethanol is exempted.
3. Approximately $12.50 (100 Yuan) in profit is guaranteed for each MT of ethanol.
4. Grain reserve subsidies can be granted by supplying grain stocks on a preferential basis. Stock grain subsidies are determined by referencing market prices in each relevant area.
5. The government will cover any loss incurred as a result of adjustment, transportation, or sale of E10. The Ministry of Finance will provide a specified amount of compensation.

The 2006 ethanol subsidy that the government provides producers is $172/MT (1,373 Yuan/MT), according to government reports, and China has appropriated $188 million (1.5 billion Yuan) in financial subsidies to ethanol producers each year.

Before May 2006, all financial incentives and biofuel promotion were limited strictly to ethanol. On May 30, 2006, the Ministry of Finance published the *Interim Procedures for the Management of the Special Development Fund for Renewable Energy Resources*. In these interim procedures, the government outlines the creation of a special fund to encourage the development of renewable energy resources. By renewable energy resources, the procedure refers to wind energy, solar energy, hydro-energy, biomass energy, geothermal energy and ocean energy. The procedure focuses primarily on renewable alternatives to petroleum. Biomass energy, in this context, extends beyond bioethanol to also include biodiesel and

biomass power generation and methane. Companies can apply to the fund for capital to invest in research, development, demonstration and production of these biofuels.

The Chinese Government recently prioritized biomass energy ahead of wind power. This unprecedented change indicates that China is shifting its focus of official support for renewable energy from wind power to biomass energy. The Ministry of Finance and NDRC view biomass energy as their top priority among sources of renewable energy.

The Chinese government is expected to enact new fiscal policies to encourage the development of biomass energy from organic matter, in hopes to spur R&D investment. The Ministry of Finance is deliberating a cost-sharing and risk-sharing mechanism for biomass companies, by which risk funds accumulated during times of high oil prices will be used to compensate losses and sustain companies' operations if oil prices fall.

Market floats on *flat* demand and supply

Demand exclusively on the domestic front from national oil companies

The demand for denatured ethanol is determined by central government policies, including required production of E10 by the two national oil companies and monthly demand quotas for each of the fuel ethanol producers set by the oil companies.

Fuel ethanol demand would increase to approximately 5.5 million MT if China were to require E10 for transportation use nationwide. Two constraints limit this. Limited land constrains China's grain-based feedstock production. While has shift research and development to NGB feedstock for ethanol production, including sweet sorghum, cassava, and sugar, resource limitations will force China to increase imports of inputs as biofuel production increases

Ethanol supply from official producers; some hope for future ethanol imports

2005 production at 920,000 MT; 2010 target production at 4,000,000 MT

Presently there are four fuel ethanol production plants in China. Due to increased government interest in biofuels, most provincial governments are considering constructing their own production plants. There are also three new production plants in the construction phase.

Current and Future Denatured Ethanol Production

Location *(Province, City)*	**Company Name**	**Principal Feedstock**	**Actual 2005 Production** *(MT/year)*	**2007 Production Capacity**	**Supply Location**	**Supply Volume** *(MT/year)*
Heilongjiang, Zhaodong	China Resources Alcohol Co.	Corn	100,000	100,000	Heilongjiang	100,000
Jilin, Jilin	Jilin Fuel Ethanol Co.	Corn	300,000	600,000	Jilin	100,000
					Liaoning	200,000
Henan, Nanyang	Henan Tian Guan Fuel-Ethanol Co.	Wheat	200,000	200,000	Henan	86,842
					Hubei (9 cities)	113,158
					Hebei (4 cities)	
Anhui, Bengbu	Anhui BBCA Biochemical Co.	Corn	320,000	320,000	Anhui	100,000
					Shandong (7 cities)	220,000
					Jiangsu (5 cities)	

					Hebei (2 cities)	
Guangxi	China Resources Alcohol Co.	Cassava	0	110,000	Guangxi	110,000
Hebei	China Resources Alcohol Co.	Sweet potato, corn et al.	0	230,000	Hebei	230,000
Hubei	Tian Guan Fuel-Ethanol Co.	Rice	0	100,000	Hubei	100,000
Total:			920,000	1,660,000		

Note 1: Jilin will reach full production capacity in late 2007. It is planning to increase its production to 1,000,000 MT/year by 2010.
Note 2: Guangxi will begin production in October of 2007. The plant should reach full capacity (1,000,000 MT/year) by 2010. It will then supply all of southern China: Yunnan, Guizhou, Guangdong, Hong Kong, and Macao.
Note 3: Hebei will begin production in November of 2007. It will reach its full capacity (300,000 MT/year) in 2008.
Note 4: The list of cities for each province runs as follows:

Hubei: Xiangfan, Jingmen, Suizhou, Xiaogan, Shiyan, Wuhan, Wichang, Huangshi, and Ezhou
Hebei: Shijiazhuang, Baoding, Xingtai, and Handan (locations supplied by Henan)
Shandong: Jinan, Heze, Zaozhuang, Linyi, Lioacheng, Jining, and Tai'an
Jiangsu: Xuzhou, Lianyugang, Huai'an, Yancheng, and Suqian
Hebei: Canzhou and Hengshui (locations supplied by Anhui)

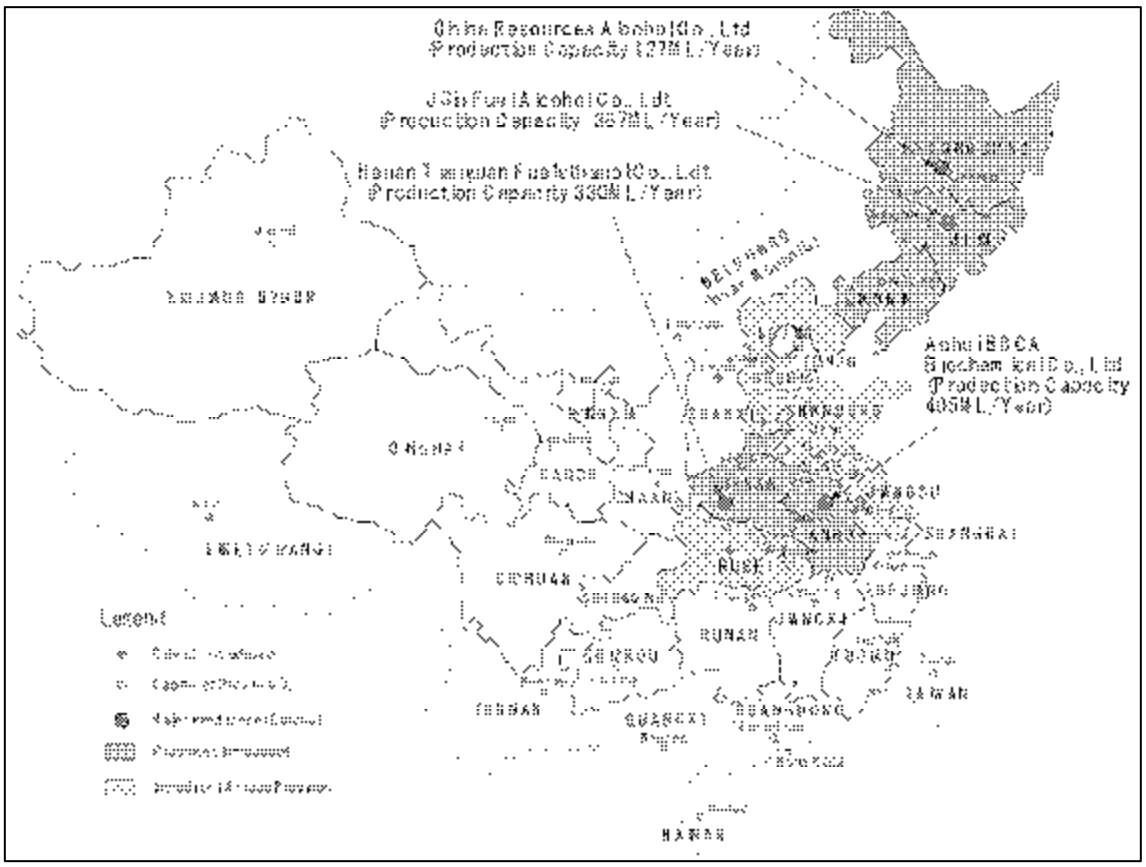
Note 5: The final three plants are not yet official: they cannot receive government subsidy or supply SINOPEC or CNPC.

Source: Law Concerning Testing for the Extensive Use of Ethanol Blended Gasoline for Automobiles and the Regulations Concerning the Conduct of Testing for the Extensive Use of Ethanol Blended Gasoline for Automobiles

An historical look at China's ethanol production

Year	Production Quantity
2002 and before	Official fuel ethanol production began in 2004. There is little recorded fuel ethanol production before this time.
2003	>20,000 MT/year
2004	300,000 MT/year
2005	920,000 MT/year
Aggregate	~1,220,000 MT/year

Locations of Ethanol Plants and E10 Pilot Ethanol Use Areas at the End of 2005



Source: Institute for Energy Economics, Chew Chong Siang

The primary method of transporting ethanol from the plants to the two major gasoline suppliers is via truck, and there is no official discussion on alternative transportation methods. SINOPEC and CNPC blend the ethanol and distribute it. The supply range differs according to each production plant. Recent studies show that the optimized production for a plant is 60,000 MT/year, incorporating feedstock harvest and transportation to the plant, and ethanol distribution distances. The smallest current ethanol producer, China Resources Alcohol Co. in Heilonjiang, has a reasonable distribution range of 50-100 km.

No current ethanol trade but the future hopeful

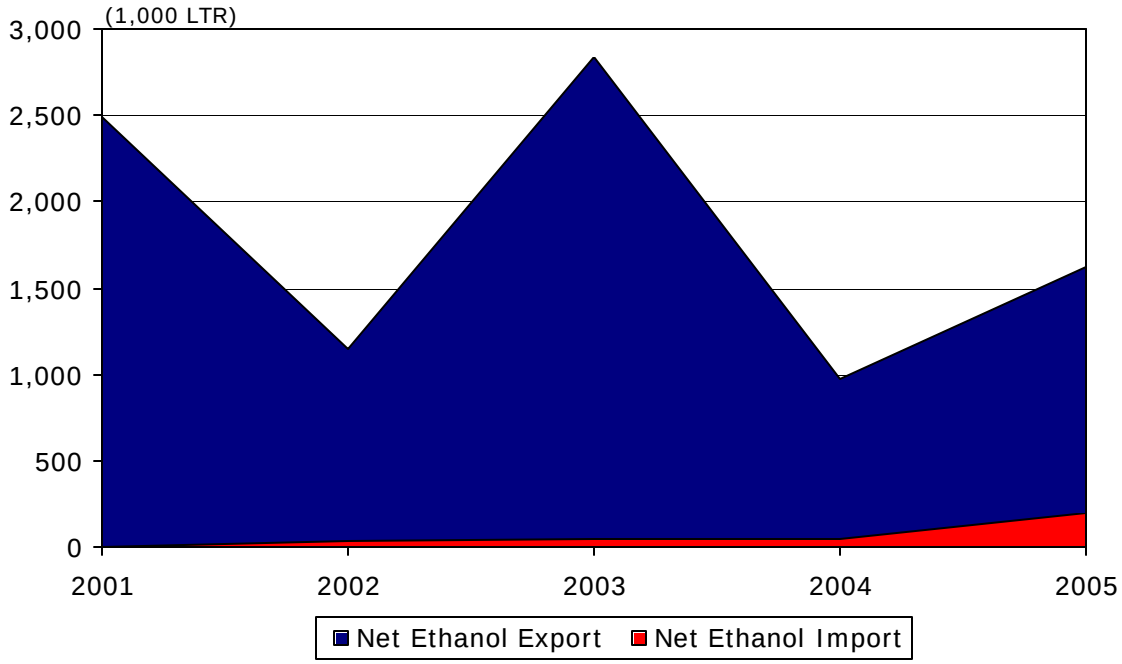
China has been eyeing Brazilian fuel-ethanol for some time, and imports could begin in the near future. Presently, the biofuel market is a domestic one in most countries around the world. Only 10 percent of biofuels produced in the world are sold internationally; Brazil accounts for roughly half of those sales.

China Ethanol Export in 2001-2005 in 1,000 LTR						
HTS#	**Description**	**2001**	**2002**	**2003**	**2004**	**2005**
	Total Ethanol	249,422	115,248	284,101	96,912	162,204
220710	Undenatured	234,323	99,748	276,084	91,596	158,654
220720	Denatured	15,099	15,500	8,017	5,316	3,550
China Ethanol Import 2001-2005 in 1,000 LTR						

HTS#	Description	2001	2002	2003	2004	2005
	Total Ethanol	455	3,558	4,316	4,253	19,590
220710	Undenatured	137	1,435	2,258	2,021	15,936
220720	Denatured	318	2,122	2,058	2,232	3,654

Source: China Customs data

Net Ethanol Trade (2001-2005)

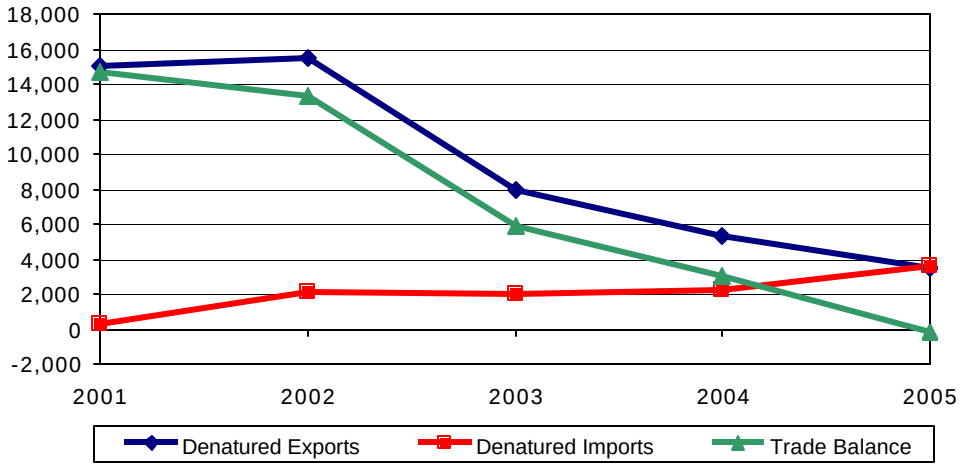


China Ethanol Export by Destination in 2001-2005 in 1,000 LTR						
Rank	Country	2001	2002	2003	2004	2005
0	World	249,422	115,248	284,101	96,912	162,204
1	Japan	151,310	81,971	152,755	49,975	79,375
2	Korea, South	72,719	18,874	80,664	16,881	39,144
3	Taiwan	10,741	10,177	26,363	21,909	22,655
4	Korea, North	2,348	2,053	1,690	6,844	14,648
5	Singapore	744	372	15,189	46	5,063
6	Myanmar	667	623	734	417	309
	Others	10,894	1,179	6,707	840	1,010

China Ethanol Import by Origin 2001-2005 in 1,000 LTR						
Rank	Country	2001	2002	2003	2004	2005
0	World	455	3,558	4,316	4,253	19,590
1	South Africa	0	0	0	0	11,610
2	Brazil	0	1,335	2,139	1	3,542
3	Japan	52	1,765	1,827	1,900	1,807
4	New Zealand	0	0	0	36	1,298

5	Korea, South	40	21	24	40	992
6	Australia	35	20	33	1,877	108
7	Taiwan	87	134	109	114	103
8	United States	15	9	31	25	35
9	United Kingdom	17	29	32	9	31
10	Germany	4	7	7	32	31
	Others	205	238	115	218	32

Denatured Ethanol Imports and Exports (2001-2005)



China began a trade deficit in denatured ethanol only this year. This deficit will most likely continue as long as government policy stipulates E10 use domestically.

Domestic feedstock suppliers and importers come out on top

Corn

China's fuel ethanol industry used corn as a feedstock for 80 percent of its 2005 production and is forecast to use corn for 90 percent of its 2006 production. Henan's Tian Guan Group is the only plant to rely more heavily on wheat for denatured ethanol production. If China continues to rely on corn for bioethanol production, it could increase corn consumption by 25 percent by the end of the decade, forcing the country to import 10 million tons of corn a year by 2010. Corn consumption in China would rise at an average of 5 percent a year, while corn used for ethanol would increase at a rate of 10 percent a year.

The growth of corn use for industrial purposes may impact China's feed industry during the upcoming years. Currently, the demand for corn from China's feed industry stands at roughly 68 percent of the total demand, forecast to reach 93 million MT in 2006/2007. Industrial consumption of corn accounts for 20 percent of the total corn demand and is forecast to reach 27.5 million tons in 2006/2007, up by 25 percent from 2005/2006. Ethanol production accounts for 40 percent of the total industrial corn use. If the government were to mandate E10 at the national level, industry capacity would be lifted by at least 5 million MT. Any planned increase in ethanol production will likely result in a higher demand for corn. This could turn china from a net export of corn to a net importer.

CORN	*Revised* USDA Official	*Revised* USDA Official	*Revised* USDA Official	*Revised* USDA Official	*Estimate* USDA Official	*Forecast* USDA Official	*UOM*
Market Year Begin	10/2001	10/2002	10/2003	10/2004	10/2005	10/2006	MM/YYYY
Area Harvested	24282	24634	24068	25446	26800	27000	(1000 HA)
Beginning Stocks	102372	84788	64973	44852	36555	35000	(1000 MT)
Production	114088	121300	115830	130290	139370	138000	(1000 MT)
TOTAL Mkt. Yr. Imports	39	29	2	2	75	100	(1000 MT)
Oct-Sep Imports	39	29	2	2	75	100	(1000 MT)
Oct-Sep Import U.S.	20	0	1	2	0	0	(1000 MT)
TOTAL SUPPLY	216499	206117	180805	175144	176000	173100	(1000 MT)
TOTAL Mkt. Yr. Exports	8611	15244	7553	7589	4000	4000	(1000 MT)
Oct-Sep Exports	8611	15244	7553	7589	4000	4000	(1000 MT)
Feed Dom. Consumption	94000	96000	97000	98000	101000	103000	(1000 MT)
TOTAL Dom. Consumption	123100	125900	128400	131000	137000	141000	(1000 MT)
Ending Stocks	84788	64973	44852	36555	35000	28100	(1000 MT)
TOTAL DISTRIBUTION	216499	206117	180805	175144	176000	173100	(1000 MT)

The area planted for Chinese corn will rise to around 27 million ha in 2006, up by approximately 1 percent from last year. Post forecast that total corn output in 2006 be around 140 mmt, reaching a record level. Favorable agricultural policy from the central government has helped farmers' incomes and stimulated growth.

Sugar

Environmental concerns have dissuaded many plants from using sugarcane and sugar beets for ethanol production. China's State Environmental Protection Agency (SEPA) is carrying out environmental impact assessments for all ethanol production technology. Due to inefficient and wasteful production technologies, sugar for fuel ethanol production is unlikely.

SUGAR	*Revised* USDA Official	*Revised* USDA Official	*Revised* USDA Official	*Revised* USDA Official	*Estimate* USDA Official	*Forecast* USDA Official	*UOM*
Market Year Begin	10/2001	10/2002	10/2003	10/2004	10/2005	10/2006	MM/YYYY
Beginning Stocks	1004	869	2021	2323	1757	1407	(1000 MT)
Beet Sugar Production	1090	1327	638	655	900	1100	(1000 MT)
Cane Sugar Production	7215	10053	10096	9171	8700	10005	(1000 MT)
TOTAL Sugar Production	8305	11380	10734	9826	9600	11105	(1000 MT)
Raw Imports	1234	710	1031	1172	1050	900	(1000 MT)
Refined Imp.(Raw Val)	141	132	204	188	350	200	(1000 MT)
TOTAL Imports	1375	842	1235	1360	1400	1100	(1000 MT)
TOTAL SUPPLY	10684	13091	13990	13509	12757	13612	(1000 MT)
Raw Exports	9	10	10	12	10	10	(1000 MT)
Refined Exp. (Raw Val)	451	110	57	340	140	400	(1000 MT)
TOTAL EXPORTS	460	120	67	352	150	410	(1000 MT)
Human Dom. Consumption	9355	10950	11600	11400	11200	11200	(1000 MT)
Other Disappearance	0	0	0	0	0	0	(1000 MT)
Total Disappearance	9355	10950	11600	11400	11200	11200	(1000 MT)
Ending Stocks	869	2021	2323	1757	1407	2002	(1000 MT)
TOTAL DISTRIBUTION	10684	13091	13990	13509	12757	13612	(1000 MT)

Wheat

Wheat is currently the principal feedstock source for fuel ethanol at the Henan plant. There are three reasons wheat not likely to be a large component in China's biofuel production: high domestic demand for food; relatively low efficiency rate in ethanol production; government policies away from the use of grain-based feedstock in ethanol production.

	Revised	*Revised*	*Revised*	*Revised*	*Estimate*	*Forecast*	*UOM*

WHEAT	USDA Official	USDA Official	USDA Official	USDA Official	USDA Official	USDA Official	
Market Year Begin	07/2001	07/2002	07/2003	07/2004	07/2005	07/2006	MM/YYYY
Area Harvested	24640	23910	22000	21626	22900	23500	(1000 HA)
Beginning Stocks	91877	76588	60378	43293	38819	34972	(1000 MT)
Production	93873	90290	86490	91950	97450	105000	(1000 MT)
TOTAL Mkt. Yr. Imports	1092	418	3749	6747	1100	700	(1000 MT)
Jul-Jun Imports	1092	418	3749	6747	1100	700	(1000 MT)
Jul-Jun Import U.S.	221	89	1466	1786	0	0	(1000 MT)
TOTAL SUPPLY	186842	167296	150617	141990	137369	140672	(1000 MT)
TOTAL Mkt. Yr. Exports	1512	1718	2824	1171	1397	2000	(1000 MT)
Jul-Jun Exports	1512	1718	2824	1171	1397	2000	(1000 MT)
Feed Dom. Consumption	9000	6500	6000	4000	3500	4000	(1000 MT)
TOTAL Dom. Consumption	108742	105200	104500	102000	101000	101000	(1000 MT)
Ending Stocks	76588	60378	43293	38819	34972	37672	(1000 MT)
TOTAL DISTRIBUTION	186842	167296	150617	141990	137369	140672	(1000 MT)

Lignocellulosic

United States-based organic and natural food company SunOpta recently announced that it is selling what will be the first cellulosic ethanol plant in China. Cellulosic ethanol can be produced from basically any organic matter (agricultural waste, grasses, sewage, sludge, switchgrass, plant stalks, trees—virtually anything that contains carbon), instead of solely from traditional feedstock (corn, wheat, rice, sugar). Generally, cellulosic ethanol is not commercial viable, but China will test this with the first cellulosic ethanol production plant up and running by 2008. When viable, in China, most production plants will retrofit current ethanol production plants for lignocellulose production.

Cassava

The Guangxi Zhuang Autonomous Region in southern China plans to build a fuel ethanol production facility capable of producing one million MT of fuel ethanol by 2010. The plant is a joint venture between China Resources Alcohol Co., a subsidiary of the China National Cereals, Oils and Feedstuffs Corp. (COFCO), and SINOPEC. (COFCO holds 85 percent of shares, while SINOPEC holds the remainder.) The plant is scheduled to begin operations in October of 2007 at a production capacity of 110,000 MT per year. The initial output will

supply Guangxi. When at maximum capacity, the plant hopes to provide fuel ethanol to all of southern China (Yunan, Guizhou, Guangdong, Hong Kong, and Macao), principally using Cassava.

Total cassava production in China at present is estimated at 13.3 million MT. Guangxi already produces over 60 percent of China's total cassava output. Cassava alone, some scholars predict, could supply as much as 4 million MT of fuel ethanol in China. Production is estimated to expand greatly in the next few years: Guangxi expects to expand its acreage planted for cassava from 260,000 ha to over 660,000 ha. China could grow cassava on 2.471 million acres of barren land, adding 21 million MT to the crop. Technological advances alone could help raise yields by 7 million MT.

Thailand, the world's top cassava producer, already converts some of the vegetable into fuel ethanol.

China's Cassava (071410) Imports from the World by Metric Ton 2000-2005							
	2000	2001	2002	2003	2004	2005	2006
Total Imports	**256,573**	**1,950,043**	**1,760,294**	**2,368,260**	**3,442,412**	**3,335,415**	**2,098,362**
Thailand	61,411	1,629,870	1,425,371	1,874,362	2,734,389	2,695,576	1,444,795
Vietnam	34,081	156,996	212,878	453,132	522,296	411,573	605,469
Indonesia	161,080	163,155	122,040	40,766	185,728	228,265	48,098

Note: 2006 data is for January to May only.

Cassava imports into China are surging. The black market also explains the surge in China's imports of tapioca chips from Thailand.

Henan's Tian Guan Group has entered into a contract with the government of Laos, leasing 15 square km of land for the production of cassava-based ethanol. The plant will ship the harvested cassava to China for ethanol production.

Sorghum

Sweet sorghum, a native root plant from Africa, is a promising alternative for fuel ethanol production. Sorghum can grow in areas of drought. Once scientists finish research for sorghum-based ethanol production, production could expand significantly.

SORGHUM	*Revised* USDA Official	*Revised* USDA Official	*Revised* USDA Official	*Revised* USDA Official	*Estimate* USDA Official	*Forecast* USDA Official	*UOM*
Market Year Begin	10/2001	10/2002	10/2003	10/2004	10/2005	10/2006	MM/YYYY
Area Harvested	783	843	840	568	550	520	(1000 HA)
Beginning Stocks	130	161	143	247	156	141	(1000 MT)
Production	2722	3327	3300	2328	2300	2200	(1000 MT)
TOTAL Mkt. Yr. Imports	3	2	4	9	10	15	(1000 MT)
Oct-Sep Imports	3	2	4	9	10	15	(1000 MT)

Oct-Sep Import U.S.	0	0	0	0	0	0	(1000 MT)
TOTAL SUPPLY	2855	3490	3447	2584	2466	2356	(1000 MT)
TOTAL Mkt. Yr. Exports	19	88	80	28	25	20	(1000 MT)
Oct-Sep Exports	19	88	80	28	25	20	(1000 MT)
Feed Dom. Consumption	685	765	775	400	400	200	(1000 MT)
TOTAL Dom. Consumption	2675	3259	3310	2400	2300	2200	(1000 MT)
Ending Stocks	161	143	57	156	141	136	(1000 MT)
TOTAL DISTRIBUTION	2855	3490	3447	2584	2466	2356	(1000 MT)

BIODIESEL

Market Demand May Exceed Ethanol

There is a rising demand for biodiesel since the diesel market is twice that of the gasoline market. The principal difficulty is the lack of eligible sources for biodiesel production. China is a net importer in all the major edible vegetable oils, the largest importer in the world. Coupled with the lack of fatty organic matter, the lack of land upon which new crops could grow exacerbates the difficulty of biodiesel production. As a result, China's ethanol production growth exceeds biodiesel's. In May of 2006, China took some preliminary steps towards biodiesel promotion by setting up a special development fund to encourage research, development, and production. Biodiesel's future in China relies on three key factors:

1. Government support and NDRC defining a clear plan for expansion, not only for biodiesel production, but also for the harvesting of NGB crops.
2. Research and development to solidify technologies for production
3. Defining and obtaining key organic sources for production. Potentials inputs include rapeseed, Jatropha nuts, switchgrass, sunflower seeds, Chinese pistachio, peanuts, sesame seeds, Barbados nuts, Fufang vines, Yousha bean, and Chinese dogwood nuts.

Present production very limited, though potential huge

Domestic production between 100,000 and 200,000 MT

Biodiesel is in the very early phases of testing and development. The *Wuhan Energy Oil Material and Biodiesel Engineering Technology Research Center* and the *Hubei Energy Oil Material and Biodiesel Engineering Technology Research Center* have been in the testing phase and will begin a trial production of 2,000 MT of biodiesel each year. Wuhan Airui Biodiesel Co. began producing 100,000 MT per year. Biodiesel production from Jatropha, Chinese Pistachio and rapeseed has been limited and is still in the testing phase. China plans to produce 2 million MT of biodiesel by 2010.

Sichuan Gushan Grease Chemical Engineering Company is the only company to use rapeseed oil to produce biodiesel: its capacity is 10,000 tons per year.

Currently, about 80,000 tons of biodiesel are produced from waste cooking oil. Fujian Gushan New Energy Comp Ltd is one of the larger biodiesel producers in China: it has a capacity of around 40,000 tons/year. The company collects waste oil from Beijing and other big cities.

Last year China purchased nearly 3 million tons or 75 percent of its total palm oil imports from Malaysia. Various Chinese firms have approached the Malaysian External Trade Development Corporation to purchase palm oil waste for biodiesel production. In search of long-term contracts, they were willing to pay $200-250 per ton. Initial demand from the various firms totalled 200,000 to 250,000 tons per year. The exports could fetch up to $62.5 million.

Feedstock supply hard to come by

Rapeseed

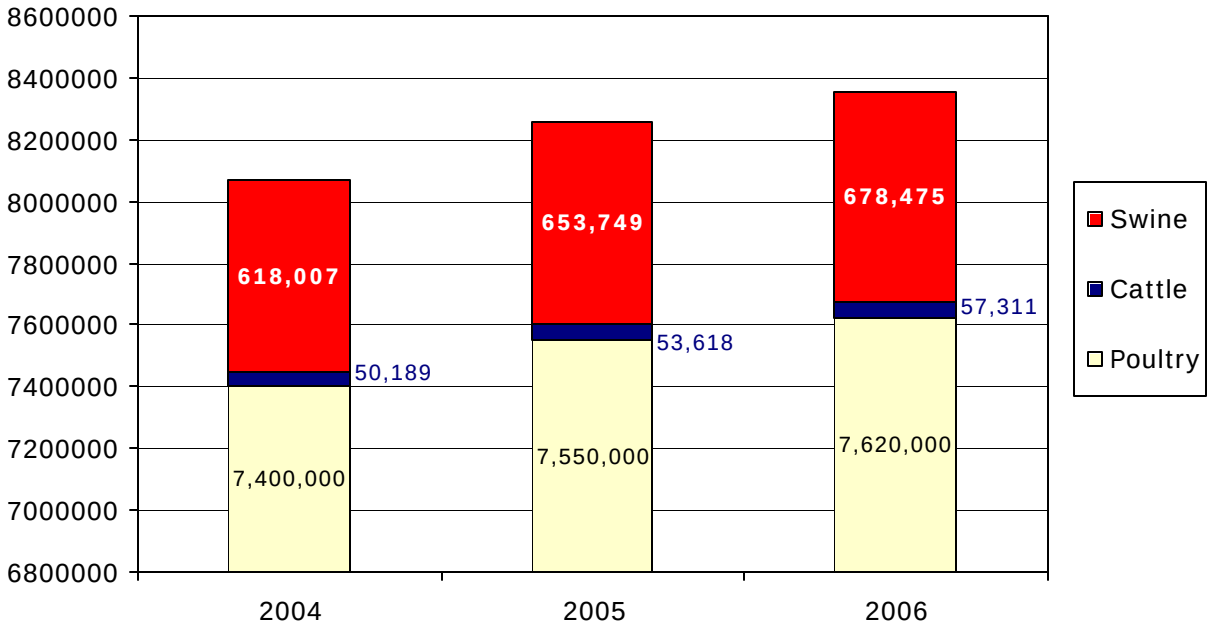
Rapeseed is a promising oilseed for biodiesel and is a potential source of biodiesel production for China. During the winter season, there are currently over 29 million hectares left fallow in the central region of China (in the regions surrounding the Yangtze River, the Yellow River, and the Huai River). If rapeseed were planted in the off-season, and established technology produces 0.64 tons of biodiesel per hectare planted, the 29 million ha could be harvested and used for the production of over 18.5 million MT of biodiesel.

RAPE-SEED	*Revised*	*Revised*	*Revised*	*Revised*	*Estimate*	*Forecast*	*UOM*
	Post Estimate [New]	Post Estimate [New]	Post Estimate [New]	Post Estimate [New]	Post Estimate [New]	Post Estimate [New]	
Market Year Begin	10/2001	10/2002	10/2003	10/2004	10/2005	10/2006	MM/YYYY
Area Harvested	7095	7143	7220	7272	7250	7200	(1000 HA)
Production	11331	10552	11420	13182	13050	12500	(1000 HA)
MY Imports	775	51	419	316	650	800	(1000 MT)
Total Supply	12106	10603	11839	13498	13700	13300	(1000 MT)
MY Exports	1	4	1	0	0	0	(1000 MT)
Crush Dom. Consumption	11405	10016	11248	12848	13010	12700	(1000 MT)
Feed, Seed, Waste Dom. Consumption	700	583	590	650	690	600	(1000 MT)
TOTAL Dom. Consumption	12105	10599	11838	13498	13700	13300	(1000 MT)
TOTAL DISTRIBUTION	12106	10603	11839	13498	13700	13300	(1000 MT)

Animal Fats/Oils

Biodiesel from animal fats and oils, while a great potential for the future, is not being explored at present. Cattle, poultry, swine, and sheep may be sources of oils and fats explored for future biodiesel production.

Livestock in China



Other possible sources

China is also exploring Jatropha and Chinese pistachios, other oil plants, for potential biodiesel sources. Industry groups have recently invested in Jatropha stands in east India. The trees take five years to grow: the investment should turn itself around in a period of ten years time. Projects to harvest Jatropha seeds are being considered in Guizhou and Sichuan provinces. Technological advances are necessary for Jatropha-based biodiesel production, however.

Plants such as sugar grass, which is suitable for salina (salt marsh) and other low-quality land in 18 provincial areas north of the Yellow River and Huaihe River basins, are also promising for biofuel production. Such lands total 33.34 million hectares, and some researchers suggest that one-fifth of them could be enough to produce 20 million MT of ethanol.

China is home to more than 1,500 types of oil plants, with over 30 of them highly adaptable and widely distributed. China produces approximately 1.5 billion tons of agricultural and food wastes and residues each year, including 100 million MT of agricultural crop stalks. These wastes have the potential of providing 50 million MT of energy.

BIOFUEL IMPACTS MAKE THE MARKET CAUTIOUS

Other concerns include food security, and dependence on the international market.

Economic Loss and Instability

Energy dependence has been the principle motivator behind national bioenergy programs. These programs require government support and put the break-even point at about $40/barrel.

Most studies put the energy ratio for corn-based (most standard form at present) ethanol production at 1:1.4—meaning that for every one unit of energy spent, only 1.4 units of ethanol energy are created. Some facilities don't meet this energy efficiency.

Ethanol will also require upgrades in the infrastructure. For example, distribution pipelines need to be watertight, as ethanol is water-soluble, but presently many are not.

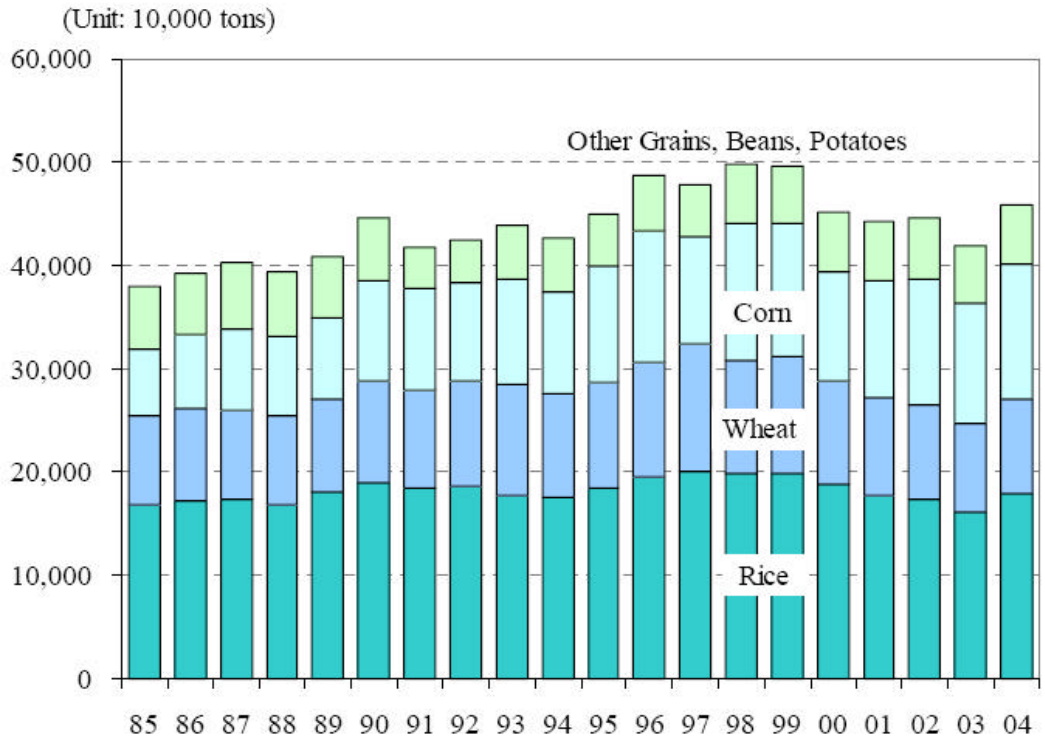
Food Security Concerns

If ethanol production remains as profitable as it is at present, the cultivation of crops for ethanol could displace food crops, reducing food production. The NDRC asserts that developing 6 million MT of biofuel ethanol production within the context of the 11th Five-Year Plan will not threaten China's grain security. It will affect its production mix and increase imports of inputs.

China has basically self-sufficient in food, but production is not stable. Self-sufficiency has been over 98 percent in the 1960s and 1970s and around 95 percent in the 1980s.

Reserves are supported by government subsidies and provide adequate food security. According to the Food and Agriculture Organization (FAO) guidelines, the food reserve safety line can be achieved if the crops in stock account for 17-18 percent of the total consumption. Based on the annual food consumption in 2003 of approximately 490 million MT in China, the food reserve safety guidelines would stipulate roughly 125 MT of food reserves. In fact, reserves are approximately 568.9 million MT (388.9 million MT on farm and 180 million MT of government's stocks), 80 million MT more than the annual food consumption of the year. The 1980s witnessed some difficult food conditions that led to a maximum of approximately 20 million MT of annual imports.

Changes in Food Production in China (1985-2003)



Source: China Statistical Yearbook 2004

Import/Export shifts

If biofuel production and consumption continues in China, China may soon see a change in its trade balance. Already there has been a change in trade trends in biofuel feedstock such as corn, wheat, sugar, and cassava. China's corn exports will begin to diminish, and various industry sources predict that China will become a net corn importer by 2008. China's wheat exports will also diminish with time. Cassava imports from Southeast Asia, particularly Laos, Vietnam and Thailand have increased greatly, thanks in large part to the booming ethanol production industry. As fuel ethanol production pulls in traditional sources of undenatured ethanol, sugar might grow as a stock for undenatured ethanol. Sugar imports may grow as a result.

The Chinese government has emphatically denied any interest in exporting fuel ethanol. As domestic demand grows, the little denatured ethanol exports that there are will die off altogether (provided official policy remain the same).

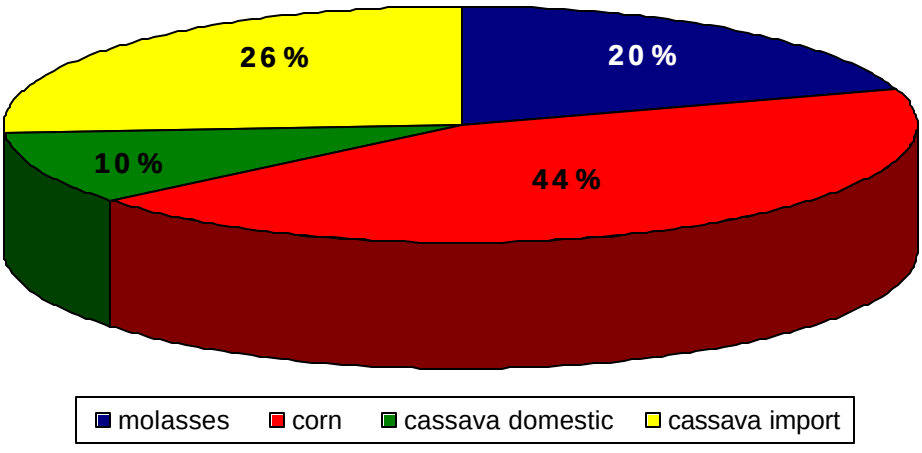
The international market can expect an increase in biofuel technology and equipment imports into China. The government views technological efficiency as a key component in its plan to pursue energy dependence and forwards biofuel development.

ALCOHOL

China has been exporting undenatured (food-grade ethanol) for some time. Future exports depend upon domestic prices/demand and international prices. If it becomes more economical to produce denatured ethanol, then many companies will shift production away from undenatured ethanol production. Likewise if demand from SINOPEC and CNPC falls, but international prices for fuel ethanol remain high enough, producers will increase output for the international market. Since the use of E10 became standard in many trials areas of China, exports have decreased. This will more than likely be the trend for the near future.

Many manufactures still use sugar byproducts, molasses especially, for undenatured (food-grade) ethanol production. It currently accounts for 20 percent of all undenatured ethanol production, some 600,000 MT/year.

Raw Materials used for Food-Grade (Undenatured) Ethanol Production



(Units: MT/Year)

Total Food Ethanol Amounts Produced: 2,000,000

From Molasses: 600,000

From Corn: 1,320,000

From domestic cassava: 30,000

From imported cassava: 78,000

SWEETENERS

Cornstarch accounts for 85 percent of national total starch output. The total corn used for starch manufacturing reached about 12 mmt in 2005, up 15 percent from the previous year. Industrial and food processing demands for starch will continue to grow in the coming years. Cornstarch production in 2004 reached 8.6 million MT and in 2005 reached 9.9 million MT, according to China Starch Industry Association. Cornstarch accounts for more than 90% of China's total starch production. Due to high prices for sugar in China over the past two years, cornstarch sweetener production in 2005 reached 4.2 million MT, 21 percent from the previous year. Starch sweetener production is estimated to exceed 5 million MT in 2006.

China's Starch Imports in 2000-2004					
Description	Jan-Dec 2000	Jan-Dec 2001	Jan-Dec 2002	Jan-Dec 2003	Jan-Dec 2004
Starch	143,027,520	205,401,202	358,723,451	574,843,562	756,546,679
Starch (cassava)	105,002,688	178,664,087	329,007,257	539,925,737	724,716,351
Starch (potato)	28,192,222	16,008,451	20,035,221	25,327,660	19,722,927
Starches (nesoi)	6,019,117	4,700,365	5,222,459	5,609,875	5,340,745
Starch (corn)	2,468,930	3,461,638	1,772,997	1,120,627	3,095,044
Starch (wheat)	1,305,693	2,487,916	2,629,917	2,580,057	2,758,977
Inulin	38,870	78,745	55,600	279,606	912,635

The price of corn-based starch has been relatively stable when compared with sugar prices. In MY06/07, corn-based sweeteners will continue to be competitive in the food-processing sector. The use of corn-based sweeteners in 2005 was equivalent to about 3 MMT of cane sugar. The sugar-byproduct molasses will continue to be an important feedstock for food-grade ethanol production. The government does not regulate food-grade ethanol production as it does fuel-grade ethanol. Undenatured ethanol plants are far too numerous for government regulation. Besides, production quantities tend to be minimal in comparison with the large fuel ethanol production plant quotas.

Appendix I: List of Kyoto Protocol Annex-I Countries

Austria
Belgium
Bulgaria
Canada
Czech Republic
Denmark
Australia
Estonia
Finland
France
Germany
Greece
Hungary
Iceland
Ireland
Italy
Japan
Latvia
Liechtenstein
Luxembourg
Monaco Netherlands
New Zealand
Norway
Poland
Portugal
Romania
Russian Federation
Slovakia
Spain
Sweden
Switzerland
United Kingdom of Great Britain and Northern Ireland
United States of America

Appendix II: Tariff Schedule for Biofuel & Biofuel-Related-Commodity Imports

HS	Description	MFN%	CP	Gen%	VAT	Drawbk Low	Unit	S&C
17025000	Corn sweetener, solid (chemically pure fructose)	30		80	17	13	kg	A

17026000	Corn sweetener, liquid (other fructose and fructose syrup, containing in the dry state more than 50 percent by weight of fructose, excluding invert sugar)	30		80	17	13	kg	BA
22071000	Ethanol, undenatured, regardless of feedstock, ("undenatured ethyl alcohol of an alcoholic strength by volume of 80% vol. or higher")	30	10	80	17	13	ltr/kg	7ABG
22072000	Ethanol, denatured, regardless of feedstock, ("ethyl alcohol and other spirits, denatured)	30	10	80	17	13		
22072010	Ethanol, denatured, regardless of feedstock, ("ethyl alcohol, denatured of any strength")	30	10	80	17	13		ABG
22072090	Ethanol, denatured, regardless of feedstock, ("other spirits, of any strength")	30	10	80	17	13		ABG
38249040	Polymethyl polyphenyl isocyanates (poly-MDI)	6.5	6	35	17	13		
10051000	Seed (corn)	20		180	13	13	kg	
1005100010	Maize (corn) seed (in-quota)	1		180	13	13	kg	4xAByt
1005100090	Maize (corn) seed (out-of-quota)	20		180	13	13	kg	4xABy
10059000	Other types of corn	65		180	13	13	kg	
1005900010	Other maize (corn) (in-quota)	1		180	13	13	kg	4xAByt
1005900090	Other maize (corn) (out-of-quota)	65		180	13	13	kg	4xABy
11081200	Maize (corn) starch	20		50	17	13	kg	AB
10011000	Durum wheat	65		180	13	13	kg	
1001100010	Durum wheat (in-quota)	1		180	13	13	kg	4xABty
1001100090	Durum wheat (out-of-quota)	65		180	13	13	kg	4xABy
10019010	Seed (wheat)	65		180	13	13	kg	
1001901010	Wheat, seed (in-quota)	1		180	13	13	kg	4xABty
1001901090	Wheat, seed (out-of-quota)	65		180	13	13	kg	4xABy
10019090	Other	65		180	13	13	kg	
HS	**Description**	**MFN%**	**CP**	**Gen%**	**VAT**	**Drawbk Low**	**Unit**	**S&C**
1001909010	Other wheat and maslin (in-quota)	1		180	13	13	kg	4xABty
1001909090	Other wheat and maslin (out-of-quota)	65		180	13	13	kg	4xABy
12129100	Sugar beet:	20		70	13	5	kg	AB

12129953	Sugar cane	0		0	13	5	kg	
1212995310	Sugar cane, seed, fresh	0		0	13	5	kg	AB
1212995390	Other sugar cane, seed	0		0	13	5	kg	AB
12129959	Other (sugar)	0		0	13	5	kg	AB
07141010	Fresh (cassava)	10		30	13	5	kg	AB
07141020	Dried (cassava)	5		30	13	5	kg	AB
07141030	Chilled or frozen (cassava)	10		80	13	5	kg	AB

Note: See Appendix IV for Harmonized Tariff Schedule Abbreviations and Codes
Source: 2006 Customs Import and Export Tariff of the People's Republic of China

Appendix III: List of Harmonized Tariff Schedule Abbreviations and Codes

HS#: the Harmonized Tariff System code number
MFN%: the percent ad valorem tariff China levies on imports originating from countries that have Most Favored Nation status with China
CP%: the percent ad valorem tariff China levies on imports originating from Pakistan
Drawback%: Export Drawback Rate
Unit: the official unit of measure applied by Chinese Customs
S&C: Supervision Conditions, respective codes represent the licenses or other documents that should be submitted to Customs at the time of import or export.

Code	Name of License or Instrument of Ratification
4	Export license
7	Automatic import license
A	Certificate of inspection for goods inward
B	Certificate of inspection for goods outward
G	Import and export license for chemicals
t	Certificate of customs quota
x	Export license (processing table)
y	Export license (small trade volume)

Unofficial translations of the NDRC's most recent publication on biofuels (its 2004 Law Concerning Testing for the Extensive Use of Ethanol Blended Gasoline for Automobiles and the Regulations Concerning the Conduct of Testing for the Extensive Use of Ethanol Blended Gasoline for Automobiles, and the 2006 Interim Procedures for the Management of the Special Development Fund for Renewable Energy Resources) are available at http://www.usdachina.org. These circulars recount with greater detail the pilot programs and special development that this report recaps.